

■ General Description

The AME8819 is a CMOS linear regulator. It operated from 2.5V to 5.5V input voltage and delivers up to 600mA output current. The AME8819 provide low quiescent current (70uA typ) low dropout voltage ($V_{out}=3.3V$, 540mV @ 600mA typ), and excellent PSRR, thus marking them ideal for Data-Communications and battery applications.

The AME8819 provide over temperature and over current protected functions. It is stable with an output capacitance of 2.2uF or larger.

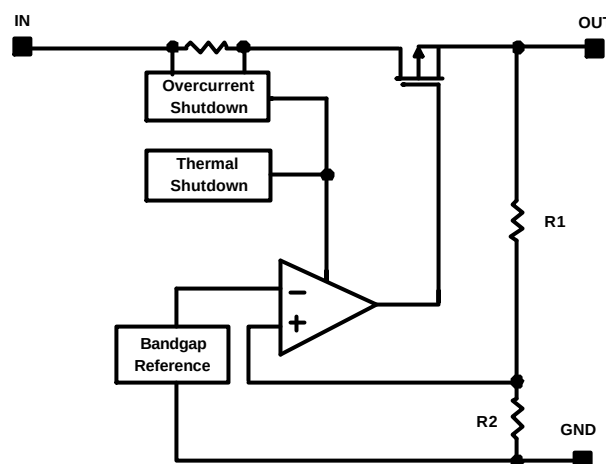
■ Features

- Input voltage range is from 2.8V to 5.5V
- Output voltage range is from 1.8V to 4.5V
- Low Dropout: 540mV @ 600mA, $V_{OUT} = 3.3V$
- Guaranteed 600mA Drive Current
- Factory Pre-set output voltage
- Only 2.2uF Output Capacitor Required for Stability (Low ESR MLCC is allowable)
- Provided OTP, current limit
- All AME 's Green Products Meet RoHS Standards

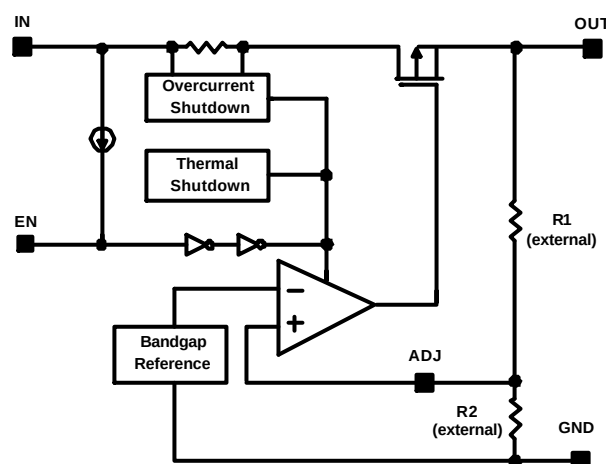
■ Applications

- Data-Communication
- Laptop, Palmtops, Notebook computers
- Battery Power Equipment
- Handheld Device
- PCMCIA Cards

■ Functional Block Diagram (Fixed Version)

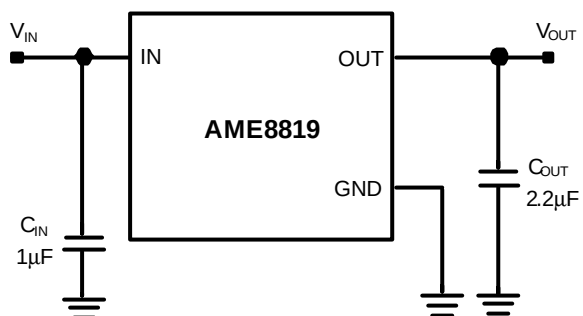


(Adjustable Version)

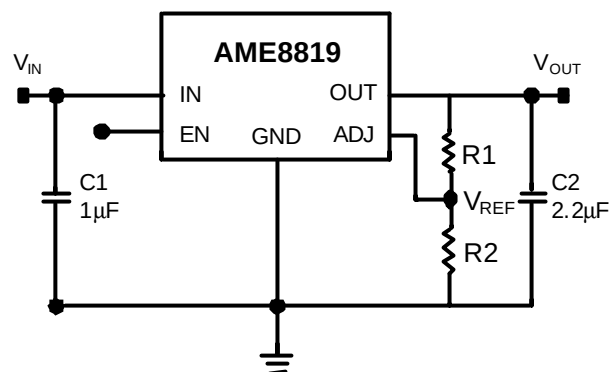


■ Typical Application

(Fixed Version)

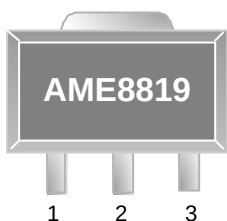


(Adjustable Version)



■ Pin Configuration

**SOT-89
Top View**

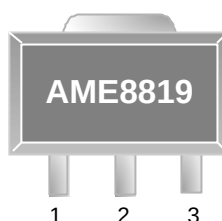


AME8819AEFT

1. IN
2. GND (TAB)
3. OUT

**Die Attach:
Conductive Epoxy**

**SOT-89
Top View**

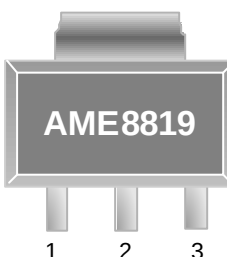


AME8819BEFT

1. GND
2. IN (TAB)
3. OUT

**Die Attach:
Non-Conductive Epoxy**

**SOT-223
Top View**

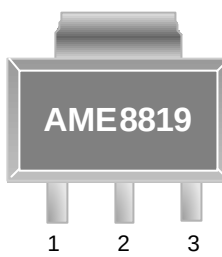


AME8819AEGT

1. IN
2. GND (TAB)
3. OUT

**Die Attach:
Conductive Epoxy**

**SOT-223
Top View**

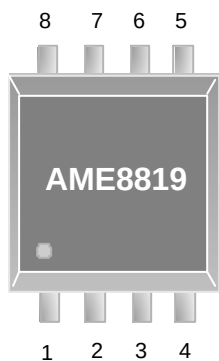


AME8819BEGT

1. GND
2. OUT (TAB)
3. IN

**Die Attach:
Non-Conductive Epoxy**

**SOP-8
Top View**



AME8819AEHAADJ

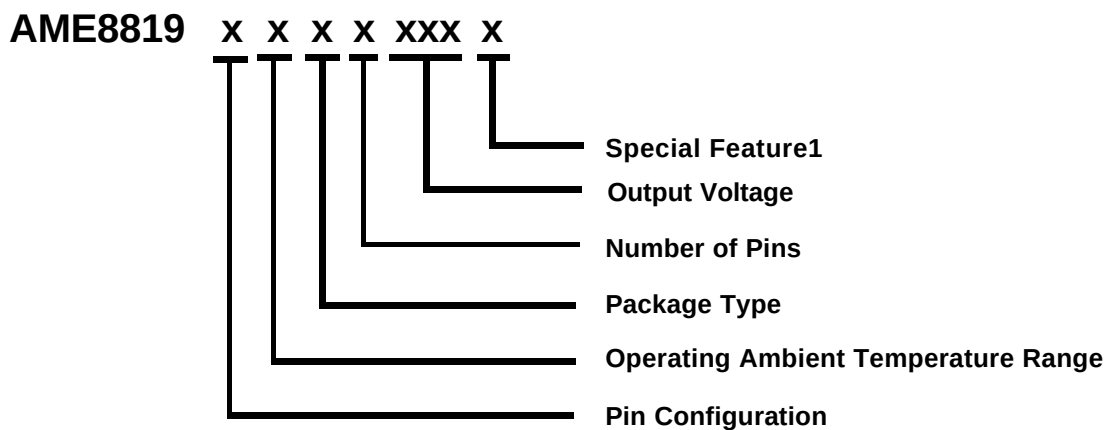
1. EN
2. IN
3. OUT
4. ADJ
5. GND
6. GND
7. GND
8. GND

**Die Attach:
Conductive Epoxy**

■ Pin Description

Pin Name	Pin Description
IN	Input voltage pin. It should be decoupled with 1 μ F or greater capacitor.
GND	Ground connection pin.
OUT	LDO voltage regulator output pin. It should be decoupled with a 2.2 μ F or greater value low ESR ceramic capacitor.
EN	Enable pin. When pulled low, the PMOS pass transistor turns off, current consuming less than 10 μ A.
ADJ	Feedback output voltage for adjustable device.

■ Ordering Information



Pin Configuration	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage	Special Feature 1
A: 1. IN (SOT-89) 2. GND (SOT-223) 3. OUT B: 1.GND (SOT-89) 2.IN 3.OUT B: 1.GND (SOT-223) 2.OUT 3.IN A: 1.EN (SOP-8) 2.IN 3.OUT 4.ADJ 5.GND 6.GND 7.GND 8.GND	E: -40 ^o C to +85 ^o C	F: SOT-89 G: SOT-223 H: SOP	T: 3 A: 8	180: V=1.8V 250: V=2.5V 280: V=2.8V 285: V=2.85V 290: V=2.9V 300: V=3.0V 310: V=3.1V 330: V=3.3V 360: V=3.6V ADJ: Adjustable	Z: Green

AME8819

■ Available Options

Part Number	Marking	Output Voltage	Package	Operating Ambient Temperature Range
AME8819AEFT180Z	A8819 ClyMXX	1.8V	SOT-89	-40°C to +85°C
AME8819AEFT250Z	A8819 CGyMXX	2.5V	SOT-89	-40°C to +85°C
AME8819AEFT300Z	A8819 CDyMXX	3.0V	SOT-89	-40°C to +85°C
AME8819AEFT330Z	A8819 CByMXX	3.3V	SOT-89	-40°C to +85°C
AME8819BEFT180Z	A8819 DlyMXX	1.8V	SOT-89	-40°C to +85°C
AME8819BEFT250Z	A8819 DGyMXX	2.5V	SOT-89	-40°C to +85°C
AME8819BEFT300Z	A8819 DDyMXX	3.0V	SOT-89	-40°C to +85°C
AME8819BEFT330Z	A8819 DByMXX	3.3V	SOT-89	-40°C to +85°C
AME8819AEGT180Z	A8819 AlyMXX	1.8V	SOT-223	-40°C to +85°C
AME8819AEGT250Z	A8819 AGyMXX	2.5V	SOT-223	-40°C to +85°C
AME8819AEGT300Z	A8819 ADyMXX	3.0V	SOT-223	-40°C to +85°C
AME8819AEGT330Z	A8819 AByMXX	3.3V	SOT-223	-40°C to +85°C
AME8819BEGT180Z	A8819 BlyMXX	1.8V	SOT-223	-40°C to +85°C
AME8819BEGT250Z	A8819 BGyMXX	2.5V	SOT-223	-40°C to +85°C
AME8819BEGT300Z	A8819 BDyMXX	3.0V	SOT-223	-40°C to +85°C

Note:

1. The first 2 places represent product code. It is assigned by AME such as Cl.
2. y is year code and is the last number of a year. Such as the year code of 2008 is 8.
3. A bar on top of first letter represents Green Part such as A8819.
4. The last 3 places MXX represent Marking Code. It contains M as date code in "month", XX as LN code and that is for AME internal use only. Please refer to date code rule section for detail information.
5. Please consult AME sales office or authorized Rep./Distributor for the availability of output voltage and package type.



AME8819

**Low Dropout
600mA CMOS Regulator**

■ **Available Options**

Part Number	Marking	Output Voltage	Package	Operating Ambient Temperature Range
AME8819BEGT330Z	A8819 BByMXX	3.3V	SOT-223	-40°C to +85°C

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■ Absolute Maximum Ratings

Parameter	Symbol	Maximum	Unit
Input Voltage	V_{IN}	-0.3 to 6	V
EN Voltage	V_{EN}	-0.3 to 6	V
Output Current	I_{OUT}	$P_D / (V_{IN} - V_{OUT})$	mA
Output Voltage	V_{OUT}	GND-0.3 to $V_{IN}+0.3$	V
ESD Classification	B*		

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device.

* HBM B:2000V~3999V

■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Ambient Temperature Range	T_A	-40 to +85	°C
Junction Temperature Range	T_J	-40 to +125	
Storage Temperature Range	T_{STG}	-65 to +150	

■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance (Junction to Case)	SOT-89*	Conductive Epoxy	θ_{JC}	40	$^{\circ}\text{C} / \text{W}$
		Non-Conductive Epoxy		46	
	SOT-223*	Conductive Epoxy		25	
		Non-Conductive Epoxy		31	
	SOP-8**	Conductive Epoxy		60	
Thermal Resistance (Junction to Ambient)	SOT-89	Conductive Epoxy	θ_{JA}	180	$^{\circ}\text{C} / \text{W}$
		Non-Conductive Epoxy		180	
	SOT-223	Conductive Epoxy		120	
		Non-Conductive Epoxy		135	
	SOP-8	Conductive Epoxy		150	
Internal Power Dissipation	SOT-89	Conductive Epoxy	P_D	550	mW
		Non-Conductive Epoxy		550	
	SOT-223	Conductive Epoxy		900	
		Non-Conductive Epoxy		800	
	SOP-8	Conductive Epoxy		810	
Maximum Junction Temperature				150	$^{\circ}\text{C}$
Solder Iron(10 Sec)***				350	$^{\circ}\text{C}$

* Measure θ_{JC} on backside center of tab.

** Measure θ_{JC} on center of molding compound if IC has no tab.

*** MIL-STD-202G 210F

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■ Electrical Specifications

$V_{IN} = V_{OUT(NOM)} + 1V$, $I_{OUT} = 1mA$, $C_{IN} = 1\mu F$, $C_{OUT} = 4.7\mu F$, Typical values at $T_A = 25^\circ C$, unless otherwise noted.

Parameter	Symbol	Test Conditions		Min	Typ	Max	Units
Input Voltage	V_{IN}			(Note1)		5.5	V
ADJ Input Bias Current	I_{ADJ}	$V_{IN} = 5V$, $V_{ADJ} = 0.980$			1		μA
ADJ Reference Voltage	V_{REF}			0.970	0.980	0.990	V
Output Voltage Accuracy	$V_{OUT,ACC}$			-2		2	%
Output Voltage Range	V_{OUT}			1.8		4.5	V
Output Current	I_{OUT}			600			mA
Quiescent Current	I_Q	$V_{IN} = 5.5V$, $I_{OUT} = 1mA$			70	100	μA
Dropout Voltage	V_{DROP}	$I_{OUT} = 600mA$	$1.8V \leq V_{OUT} \leq 2.5V$		800	1000	mV
			$2.5V < V_{OUT} \leq 3.3V$		540	800	
			$3.3V < V_{OUT} \leq 4.5V$		470	650	
Output Voltage Line Regulation [($\Delta V_{OUT} / \Delta V_{IN}$) x 100%] / V_{OUT}	REG_{LINE}	$V_{IN(min)} \leq V_{IN} \leq V_{IN(max)}$	$1.8V \leq V_{OUT} < 2.5V$	-0.4	0.1	0.4	% / V
		$V_{IN(min)} \leq V_{IN} \leq V_{IN(max)}$	$2.5 \leq V_{OUT} < 3.3V$	-0.2	0.03	0.2	
		$V_{OUT} + 0.3V \leq V_{IN} \leq V_{IN(max)}$	$3.3V \leq V_{OUT} < 4.5V$	-0.1	0.01	0.1	
Output Voltage Load Regulation [($\Delta V_{OUT} / V_{OUT}$) x 100%] / ΔI_{OUT}	REG_{LOAD}	$1mA \leq I_{OUT} \leq 600mA$	$1.8V \leq V_{OUT} < 2.5V$, $V_{IN} = V_{in(min)}$	-0.015		0.01	% / mA
			$2.5V \leq V_{OUT} < 3.3V$, $V_{IN} = V_{in(min)}$	-0.005		0.004	
			$3.3V \leq V_{OUT} \leq 4.5V$, $V_{IN} = V_{in(min)}$	-0.003		0.002	
Output Current Limit	I_{LIM}	$V_{OUT} = 0.8 \times V_{OUT(NOM)}$		650	800		mA
Shutdown Current	I_{SHDN}	$V_{EN} = 0V$, $V_{IN(min)} \leq V_{IN} \leq 5.5V$			5	10	μA
Power Supply Ripple Rejection	PSRR	$f = 1KHz$, $I_{OUT} = 100mA$, $C_{out} = 1\mu F$			60		dB

■ Electrical Specifications

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Enable High (enabled)	$V_{EN(HI)}$	$V_{IN(min)} \leq V_{IN} \leq 5.5V$	1.4		V_{IN}	V
Enable Low (shutdown)	$V_{EN(LO)}$	$V_{IN(min)} \leq V_{IN} \leq 5.5V$	0		0.4	V
Enable Pin Current (enabled)	I_{EN}	$V_{EN} = V_{IN}$		0.1	1	μA
Thermal Shutdown Temperature	T_{SHDN}	Shutdown, temperature increasing		150		$^{\circ}C$
	T_{RS}	Restore, temperature decreasing		130		

Note 1: $V_{IN(MIN)} = V_{OUT} + V_{DROP}$.

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■ Detailed Description

The AME8819 is low-dropout, low quiescent-current linear regulator designed primarily for battery-powered applications. It is available with present output voltage ranging from 1.8V to 3.6V, and can supply loads up to 600mA.

■ Circuit Limit

The AME8819 contains current limiters which monitor and control the pass transistor's Gate voltage, limiting the guaranteed maximum output current to 650mA minimum. The output can be shorted to ground for an indefinite time without damaging the part.

■ Thermal-Overload Protection

Thermal-overload protection limits total power dissipation in the AME8819. When the junction temperature arrive $T_j = 160^\circ\text{C}$ approximately, the thermal sensor signals the shut-down logic, turning off the pass transistor and allowing the IC to cool.

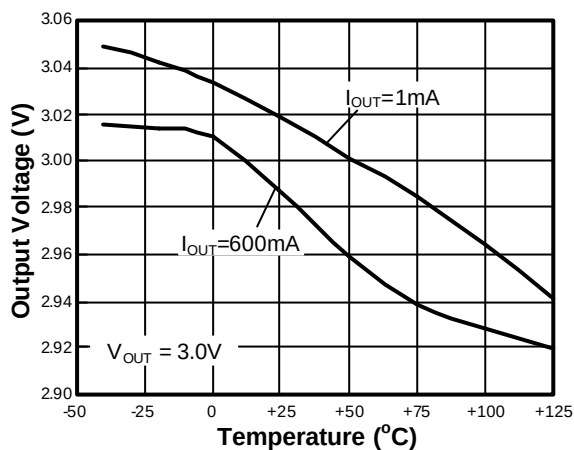
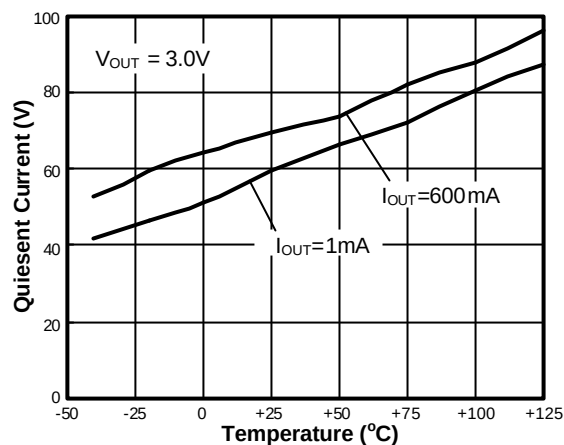
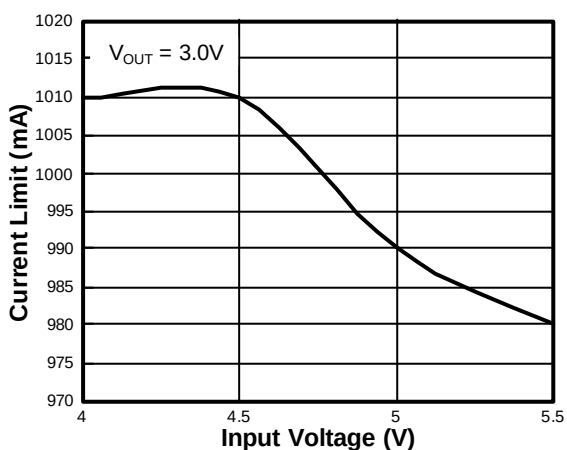
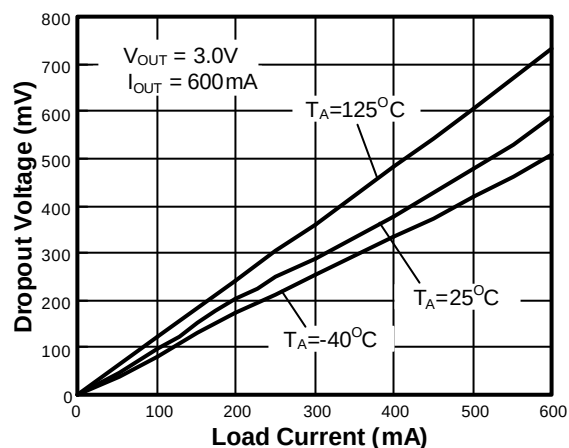
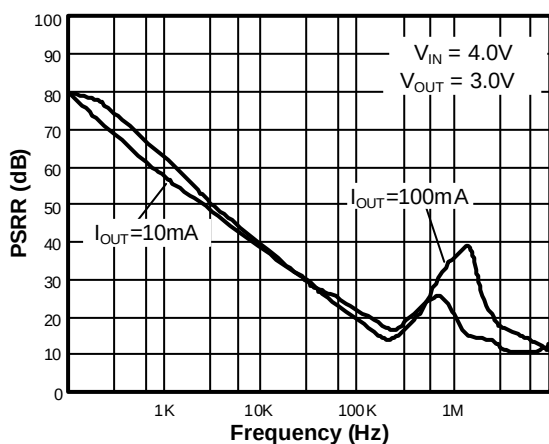
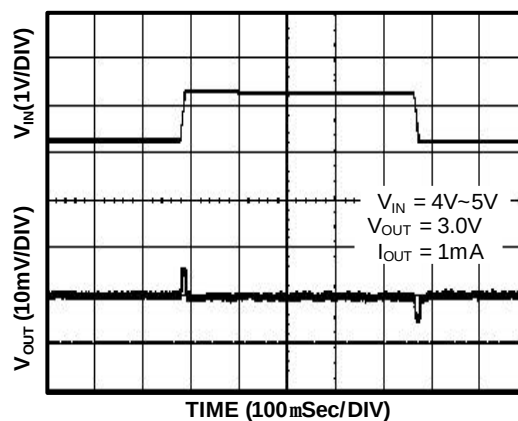
■ Capacitor Selection and Regulator Stability

Use $1\mu\text{F}$ capacitor on the OUT. Larger input capacitor values and lower ESR provide better supply noise rejection and line transient response. To reduce output noise and improve load transient voltage dips, use larger output capacitors up to $4.7\mu\text{F}$. For stable operation over the full temperature range with load currents up to 600mA, input and output capacitors should be a minimum of $2.2\mu\text{F}$ by X7R.

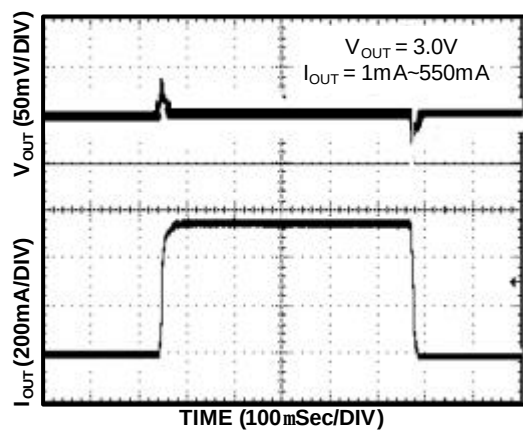
Note that some ceramic dielectrics large capacitance and ESR variation with temperature. With dielectrics such as Z5U and Y5V, it may be necessary to use $4.7\mu\text{F}$ or more for up to 600mA load current to ensure stability at temperatures below -10°C . With X7R or X5R dielectrics, $2.2\mu\text{F}$ is sufficient at all operating temperatures. These regulators are optimized for ceramic capacitors. Tantalum capacitors are not recommended.

■ PSRR and Operation from sources Other than Batteries

The AME8819 is designed to deliver low-dropout voltage and low quiescent currents in battery-powered system. Power-supply rejection ratio is 60dB(Typ.) at 1KHz (see PSRR vs Frequency Curve). When operating from sources other than batteries, PSRR and transient response can be improved by increasing input, output capacitors.

Output Voltage vs Temperature

Quiescent Current vs Temperature

Current Limit vs Input Voltage

Dropout Voltage vs Load Current

Power Supply Rejection Ratio

Line Transient Response


Load Transient Response

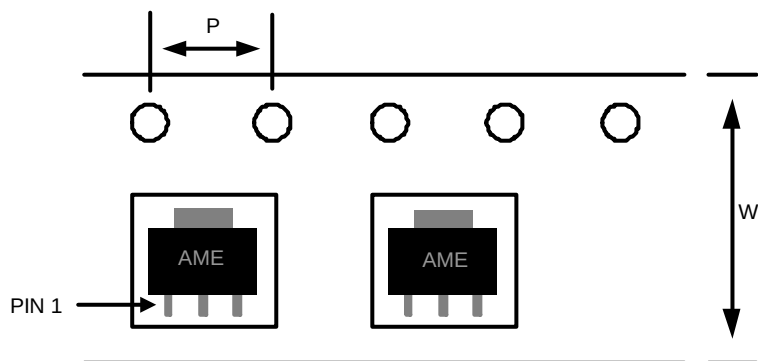


■ Date Code Rule

Month Code	
1: January	7: July
2: February	8: August
3: March	9: September
4: April	A: October
5: May	B: November
6: June	C: December

■ Tape and Reel Dimension

SOT-89



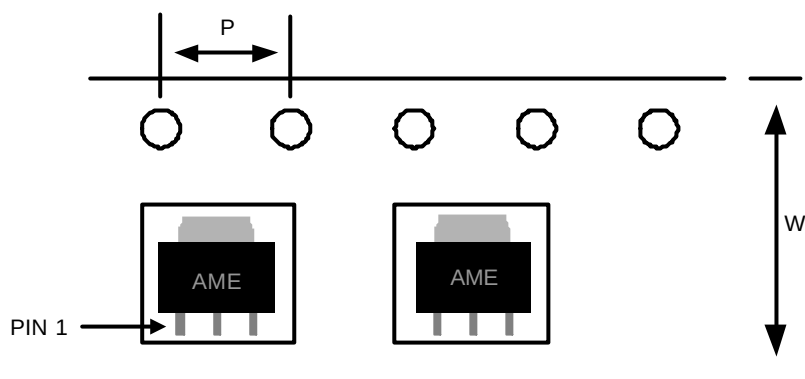
Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-89	12.0±0.1 mm	4.0±0.1 mm	1000pcs	180±1 mm

AME8819

■ Tape and Reel Dimension

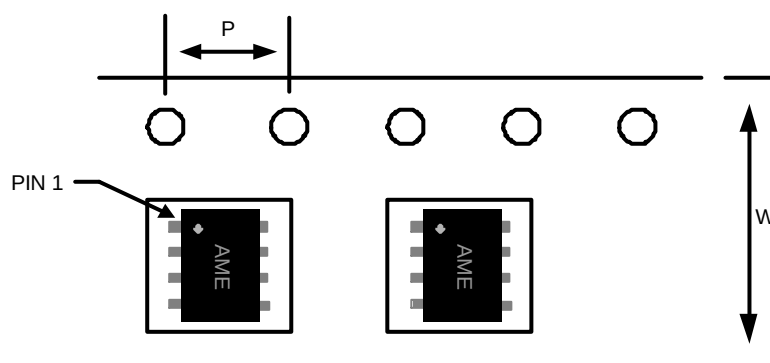
SOT-223



Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-223	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

SOP-8

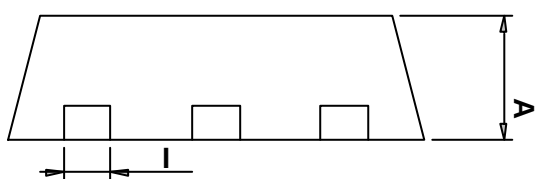
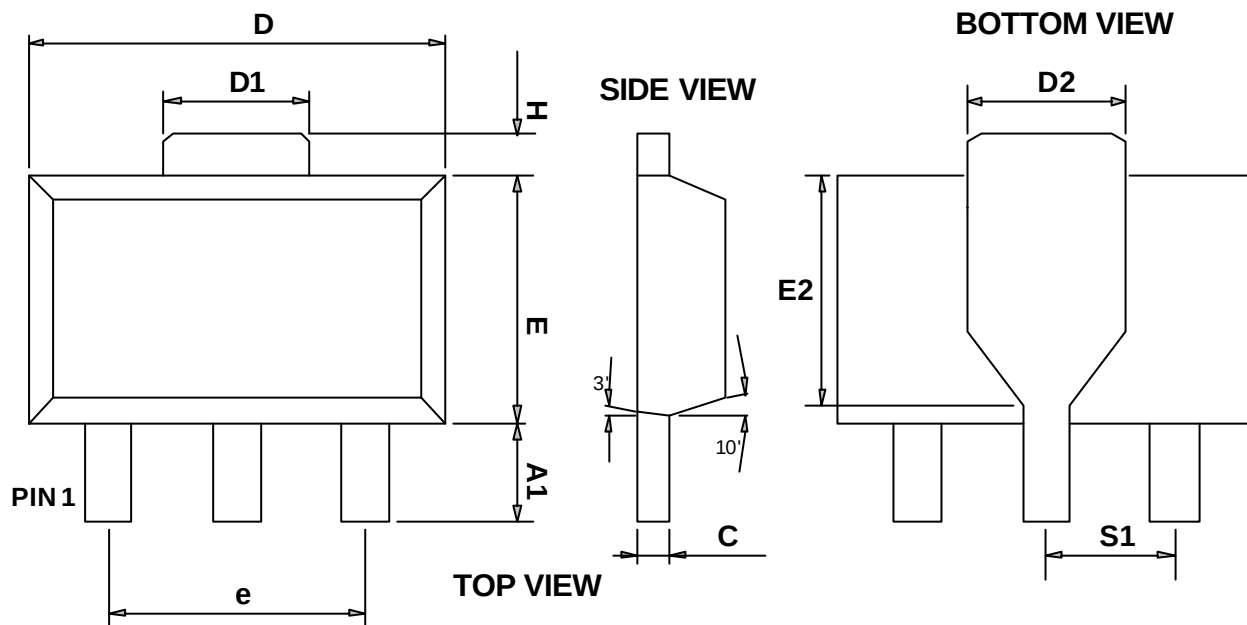


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

■ Package Dimension

SOT-89

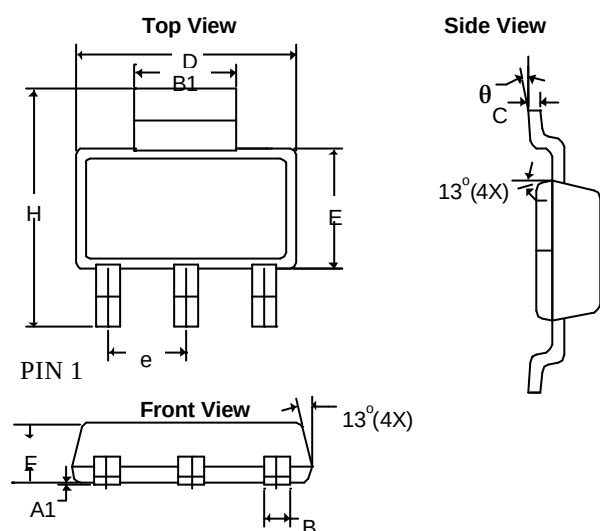


FRONT VIEW

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.39	1.60	0.05472	0.06299
A₁	0.89	1.20	0.03503	0.04724
C	0.35	0.44	0.01378	0.01732
D	4.39	4.60	0.17283	0.18110
D₁	1.35	1.83	0.05315	0.07205
E	2.28	2.60	0.08976	0.10236
I	0.36	0.56	0.01256	0.02204
e	3.00 REF		0.11811 REF	
H	0.70 REF		0.02756 REF	
S₁	1.50 REF		0.05906 REF	
E₂	2.05	2.60	0.08071	0.10236
D₂	1.50	1.85	0.05905	0.07283

■ Package Dimension

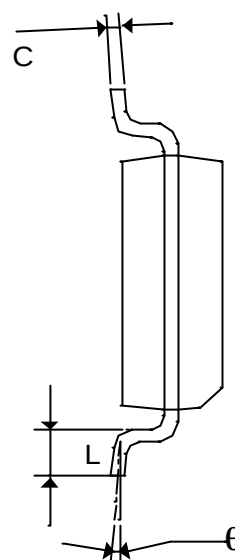
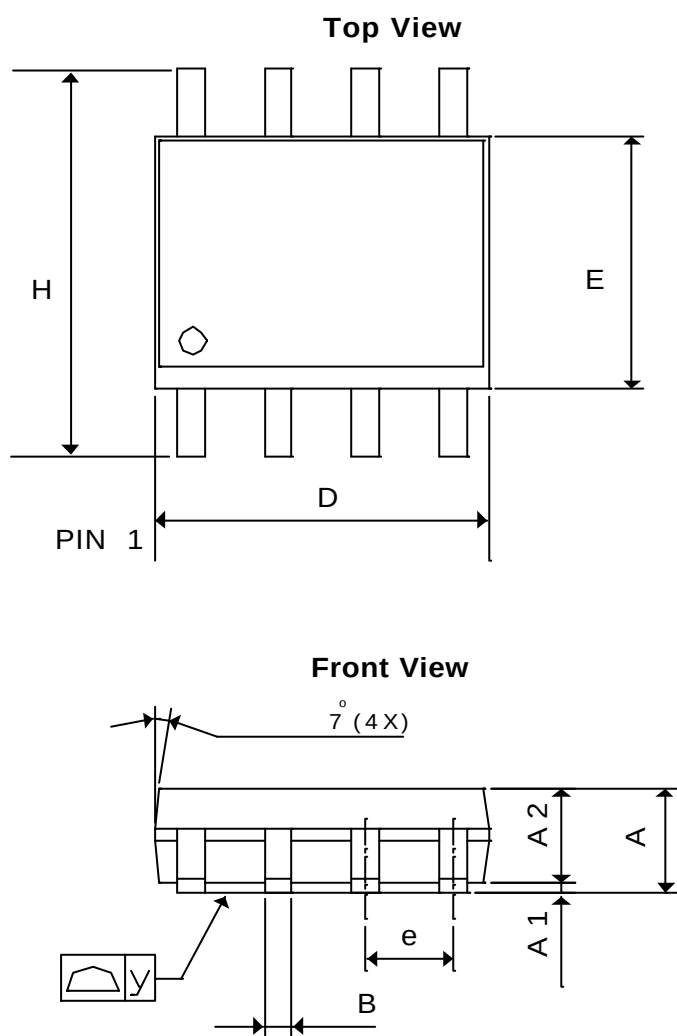
SOT-223



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A_1	0.01	0.10	0.0004	0.0039
B	0.60	0.84	0.0236	0.0330
B_1	2.90	3.15	0.1140	0.1240
C	0.24	0.38	0.0094	0.0150
D	6.20	6.71	0.2441	0.2640
E	3.30	3.71	0.1299	0.1460
e	2.30 BSC		0.0906 BSC	
F	1.40	1.80	0.0551	0.0709
H	6.70	7.30	0.2638	0.2874
q	0°	10°	0°	10°

■ Package Dimension

SOP-8


Side View

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.0531	0.0689
A₁	0.10	0.30	0.0039	0.0118
A₂	1.473 REF		0.05799 REF	
B	0.33	0.51	0.0130	0.0201
C	0.17	0.25	0.0067	0.0098
D	4.70	5.33	0.1850	0.2098
E	3.80	4.00	0.1496	0.1575
e	1.27 BSC		0.05000 BSC	
L	0.40	1.27	0.0157	0.0500
H	5.80	6.30	0.2283	0.2480
y	-	0.10	-	0.0039
q	0°	8°	0°	8°



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AME, Inc. reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

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